Cottage Grove Landfill
Chicago, IL

Draft Risk Assessment
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I. Purpose:

This memorandum presents preliminary findings regarding potential human health risk at the Cottage Grove Landfill site (the landfill) and is based upon the Expanded Site Inspection Report, Cottage Land and Lakes #2 Landfill, Chicago, Illinois, December 29, 1994. The purpose of this memorandum is to identify any human health risks at the site through the identification of contaminants of human health concern as well as exposure pathways. In addition, this assessment will identify any data gaps and the resulting assumptions required to assess risk.

II. Background:

The Cottage Grove Landfill site contains an inactive landfill that covers approximately 14 acres on an 18 acre property in Chicago, Illinois. The landfill is located directly west of the Land and Lakes #2 Landfill. Within four miles of the Cottage Grove Landfill, land use is a combination of recreational, industrial, and residential. The Cottage Grove Landfill has no engineered liner or leachate collection system.

The Cottage Grove Landfill operated from 1976 to 1982. In 1976, the present owner began landfilling activities onsite, accepting municipal, industrial, and commercial solid waste (i.e., household and demolition waste). The site was cited by IEPA for accepting hazardous waste, for which the facility was not permitted.

According to IEPA and USEPA files, inadequate capping of the landfill after closure caused slope erosion and leachate production. IEPA and FIT contractor documentation indicates that the facility has had observed leachate releases. Sampling performed in 1982 found elevated levels of contaminants in groundwater and on-site leachate ponds.

III. Data Gaps

The soil data reported in the ESI represent samples taken between 4 and 12 inches under ground. These soils would not normally be accessible and therefore cannot be considered as contributing to a complete exposure pathway. The ESI states the landfill has been capped and it is assumed that sampling was directed at obtaining contaminated soils which are located under the cap. This risk assessment uses data from the most contaminated sampling point SS06 and assumes that it is representative of a surficial soil sample. If the landfill is capped and the contaminated soils are inaccessible, then this risk assessment would greatly overestimate risk from exposure to contaminated soils.

It is likely that people consume fish caught in the Little Calumet River. Fish ingestion has been known to drive human health risk along rivers and it is possible that fish consumption could be a risk driver on this site. This assessment does not consider fish contamination data and therefore is not complete for this exposure pathway.

IV. Exposure Pathways:

In order to evaluate potential human health risk(s) that could be occurring at the site, various exposure pathways were considered. This assessment considers contamination data for soil, water and sediment. The chemicals of concern (COC) were identified by scanning the level of contamination by various compounds in the soil, water and sediment to determine whether contamination by any of the compounds was high enough to suggest possible human health risk. Heavy metals were found in the soil on the site and the COC's for human health risk in the soil were found to be beryllium and manganese. There were no COC's in the sediments or surface water. It is assumed that no one is drinking the groundwater and therefore that this is an incomplete exposure pathway.

A residence is located on the site. The residential exposure scenario generally involves maximal exposure to a given site. Any level of exposure which is less than that estimated as a residential exposure would result in less risk. Assessment of exposure using these parameters was determined to be conservative and protective for human health. In addition, to be protective, the risk analysis was performed using the highest level of contamination reported for a given chemical in a given medium. This assessment should therefore reflect the maximal risk under the defined exposure parameters. Thus, exposure to sites where the level of contamination is lower than that seen at these "hot spots," would yield a lower risk.

Exposure to contaminated soil can occur via incidental ingestion and dermal absorption. In order to be protective, dermal absorption was considered to be a risk despite the fact that, in general, metals do not absorb well through the skin.

An average residence at the site is assumed to be 30 years. In the case of the incidental ingestion exposure pathway, 5 of the 30 years are characterized by a child's exposure parameters. It is necessary to specifically assess incidental ingestion by a toddler due to the high incidence of soil/dust ingestion at this age. For dermal exposure, all 30 years are characterized by conservative adult parameters. These protective parameters were used to encompass a child's behavior pattern as well.

Another possible exposure pathway for dirt is dust inhalation. This pathway is not considered in the current assessment primarily due to vegetation in the area and the unlikelihood that this area will be heavily trafficked. If, for some reason, dust becomes an issue at the site, it would be advaisable to assess this pathway.

Data

The 1994 ESI included samples taken onsite which were located in close proximity to an onsite residence. The sample labeled SS06 was described as being "in the front yard of an onsite residence, about 35 feet from the home's front door. This sample contained the most hits for contaminants as well as some of the heaviest hits. Since this sample was so heavily contaminated and it was in close proximity to a residence, it was assumed to be representative of the worst case exposure on site. The use of this is maximum concentration gives an uper-bound estimate of the risk from the Cottage Grove Landfill.

Table 1

Media	Contaminant	Maximum Concentration (ppm)

Soil	Manganese	1,070

Soil	Beryllium	0.69

Dermal Exposure Equation-Soil

Equation for estimating exposure intake to contaminants due to dermal contact with chemicals (USEPA Risk Assessment Guidance for Superfund, 1989).

$$\text{Exposure} = \frac{CS \times SA \times AF \times ABS \times EF \times ED \times CF}{BW \times AT}$$

where:

CS	concentration in soil
SA	surface area
AF	soil to skin adherence factor
ABS	absorption
EF	exposure frequency
ED	exposure duration
BW	body weight
AT	averaging time

Table 2

Variable	Units	Value Used	Comment
CS	mg/kg	see Table 1	Data is taken from 1994 ESI
SA	cm^2	3,120 (soil)	arms and hands (adult) standard default exposure factors (RAGS Supplemental Guidance, March 1991)
AF	mg/cm^2	1	USEPA Risk Assessment Guidance for Superfund (1989)
ABS	none (fraction)	0.001	study assumption
EF	event/year	250	study assumption
ED	years	30	study assumption
CF	none	.000001	
BW	kg	70	(Exposure Factors Handbook, 1989, EPA/600/8-89/043)
AT	days	10,950 (noncancer) 25,550 (cancer)	(30 x 365) (70 x 365)